ABSTRACT

The present invention provides a novel method and apparatus for performing real-time computer garbage collection, in a manner that offers unprecedented low bounds on the worst-case frequency and duration of the collection task. The invention is used with a plurality of data objects and with one or more mutator programs. The mutators and a garbage collector run on one or more processors. The mutators each have a corresponding thread with a corresponding thread state. In the present invention, execution of all mutators is temporarily restricted at the start of each new garbage collection cycle. However, unrestricted execution of a mutator is quickly resumed, as soon as that mutator's thread state is processed. The remainder of the garbage collection cycle may be performed concurrently with the mutators. In another feature of the present invention yielding important performance benefits, the mutators are executed subject to a protective write barrier, but the write barrier does not have to be applied to the modification of mutator thread states.